TREE FRUIT CROPS

CORNELL COOPERATIVE EXTENSION

IPM Integrated Pest Management

Insect Identification
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Comstock Mealybug

Pseudococcus comstocki (Kuwana)

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The Comstock mealybug (CMB) was first reported in the United States in 1918 concurrently in New York and California, and has since spread to all coastal states and the Ohio and Mississippi River valleys. Its fruit hosts include pear, apple, and peach, and it is also a pest of several ornamental plants such as catalpa, mulberry, pine, and others. CMB was first recognized as a fruit pest in the 1930s. From 1950 to 1980, it was infrequently noticed as a fruit pest, but in the early 1980s it caused damage to apple crops in the Hudson and Champlain valleys, and to pears in western New York later in the eighties.

Adults

The Comstock mealybug adult female (fig. 1) is wingless and elongate-oval in shape, with a many-segmented body (2.5 to 5.5 mm long) and well-developed legs. It has 17 pairs of body filaments, with the caudal (posterior) pair being one-third as long as the body. The legs and antennae are inconspicuous. The body of the adult female is reddish-brown, but has a white appearance because it is covered with wax.

Because of its small size and short life span, the adult male (fig. 2) is very unlikely to be seen in the field unless it is captured in pheromone traps; even then it is difficult to distinguish without the aid of a microscope. It has a gnat-like appearance, with delicate, almost veinless wings, a light reddish-brown body (about 1 mm long), and two caudal filaments as long as or longer than the body (not shown in fig. 2). It is peculiar in having three pairs of eyes (dorsal, lateral, and ventral). The legs and 10-segmented antennae are apparent, but mouthparts are absent.

There are two generations of Comstock mealybug in New York, each taking 60 to 90 days to complete, depending on seasonal temperatures. The egg is generally thought to be the primary overwintering stage, but recent evidence from western New York indicates that some nymphs and adult females from the second (summer) generation overwinter, with eggs being laid in the spring rather than the previous fall. Adult females and males emerge at the same time, from late June to mid-July for the first (overwintering) generation, and late August to mid-September for the second (summer) generation. Adult females are present for a total of four to six weeks, and oviposit for about one week after mating. Males survive for only a few days after emerging.

Eggs

The eggs are elliptical (0.3 mm long and 0.17 mm wide) and bright orange-yellow (fig. 3), but may appear duller because of the waxy filaments covering them. Eggs are laid in jumbled masses along with the waxy filamentous secretions (fig. 4) in protected places such as under bark crevices (fig. 5), near pruning cuts, and occasionally in the calyx of fruit. The summer-generation eggs are laid from mid-June through late July, and the overwintering eggs from mid-August into October. The summer-generation eggs have an incubation period of about 11 days.

Fig. 1. Adult females in pear calyx.

Fig. 2. Adult male.

Fig. 3. Eggs of Comstock mealybug.

Fig. 4. Egg mass.

Fig. 5. Egg mass in bark.

Fig. 6. Crawler on bark.

Fig. 7. Nymphs on young tissue.

Fig. 8. Sooty mold on apple.

Fig. 9. Tape trap.

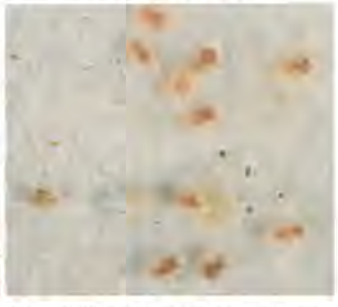


Fig. 10. Nymphs stuck on tape trap.

Larvae (crawlers)

The first and second larval instars of the female and male CMB (fig. 6) are virtually indistinguishable. They appear similar to adult females except that they are smaller, more oval-shaped, lack the long body filaments, and are more orange-yellowish because they have less wax covering. The first instar female crawler is flattened (0.3 to 0.5 mm long) and pale yellow, becoming darker in time. The second (0.9 to 1.2 mm long) and third (1.7 to 2.5 mm long) instar females are similar in appearance, but become progressively browner and redder.

The third instar of the immature male, called a "pro-pupa," is contained in a cocoon that begins forming toward the end of the second instar. It is 0.9 to 1.2 mm long and elongate-oval, with the head, thorax, and abdomen fused. The fourth stage of the immature male is the pupa. It is elongate, 1.2 to 1.4 mm long, and light reddish-brown. As with the adult male, it has three pairs of eyes and 10-segmented antennae.

The overwintered eggs hatch from mid-April through May and the nymphs (crawlers) migrate from the oviposition sites (fig. 4) to their feeding sites on terminal growth (fig. 7) and leaf undersides of trees and shrubs. This hatch is completed by the petal fall stage of pears. Nymphs that hatch from these overwintered eggs are active from roughly early May to early July. As the nymphs approach the adult stage, they tend to congregate on older branches at a pruning scar, a node, or at a branch base, as well as inside the calyx of pears. Second- (summer) generation nymphs are present from about mid-July to mid-September.

Damage

The Comstock mealybug poses two major concerns for the pear processing industry of New York: First, the emergence of crawlers and adult females from the calyx of pears (fig. 1) at the packinghouse creates a nuisance to workers. Second, pears to be made into puree typically are not peeled or cored by New York processors, so infestations can potentially result in unacceptable contamination of the product.

Another problem, of concern to apple growers in the 1930s and 1940s, and again in the Hudson and Champlain valleys in the early 1980s, is that the honeydew secreted by the crawlers is a substrate for sooty molds growing on the fruit surface (fig. 8). This problem also occurs on peaches in Ontario, Canada. These molds result in a downgrading of the fruit, and are therefore an additional cause of economic loss

Monitoring and Control

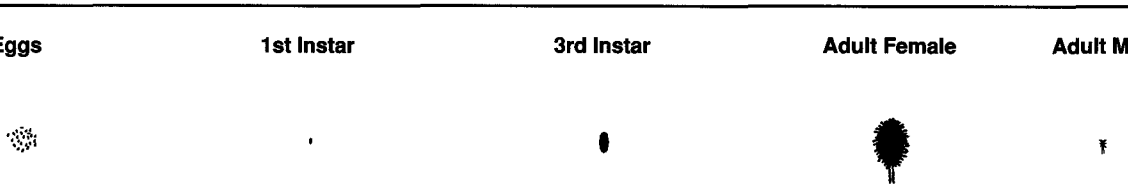
To date, the Comstock mealybug has been a problem to growers of processing pears because of the contamination and aesthetic reasons noted. Crawler infestation of pears destined for processing can be determined by examination of the calyx end. Cut the pear lengthwise to expose the inner calyx area (fig. 1), which is often concealed in the whole fruit. Once the insects have reached these sites, it is nearly impossible to remove them. Such an infestation generally indicates the need for one or more insecticide sprays during the growing season, directed against the migrating crawlers.

Examine the terminal growth for crawler activity periodically throughout the summer. Crawler and adult female activity can also be monitored by wrapping black electrical or white carpet tape (fig. 9) around scaffold branches and inspecting for crawlers that have been caught by the tape (fig. 10). They can be recognized with a hand lens or, with some experience, by the unaided eye.

For appropriate control materials and procedures in your area, consult your local source of recommendations.

GUIDE TO STAGES

Stage	Timing	Where to Look
Adults		
females—overwintering generation	late June to mid-July	green succulent tissue, scaffolds, bark
males—overwintering generation	late June to mid-July	in pheromone traps
females—summer generation	late August to mid-September	inside calyx of fruit, green succulent tissue, scaffolds, bark
males—summer generation	late August to mid-September	in pheromone traps
Eggs		
overwintering generation	October through May	in pear calyx at harvest, under bark, crevices, pruning cuts
summer generation	mid-June through late July	under bark, crevices, pruning cuts
Nymphs (crawlers)		
overwintering generation	mid-May to early July	green succulent tissue, scaffolds, bark
summer generation	mid-July to mid-September	in pear calyx at harvest, under bark, crevices, pruning cuts



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